Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

that of type 1 diabetes. Within the non-Hispanic White population, the incidence of type 1 diabetes remained considerably higher than that of type 2 diabetes throughout the observation period, although this difference narrowed with increasing age, and had virtually disappeared by the age of 18 years.

One of the most concerning findings was the 7–9% annual increase in incidence of type 2 diabetes in the Hispanic and Asian or Pacific Islander populations. This is a health-care crisis in the making. Not only does the long duration of diabetes that youth-onset leads to cause a large burden of fatal and non-fatal complications,[4] but it magnifies inter-generational effects. When type 2 diabetes is already present before pregnancy, birth outcomes are worse, and the long-term metabolic health of the offspring is adversely affected.[5] This does not bode well for the epidemic of diabetes and its complications. Adequately funded, evidenced-based interventions to reduce or at least stabilise the incidence of type 2 diabetes and to improve its management in younger people are desperately needed.

Wagenknecht and colleagues also report two novel analyses. First, they report that, among youths, the peak age of diagnosis of type 2 diabetes is at the age of 16 years and, second, that there is a seasonal peak to the incidence of type 2 diabetes in August. These findings are less certain than the trend analyses, since the timing of the presentation of type 2 diabetes can be influenced by many factors. Biological features that would explain a peak of incidence in both sexes at 16 years of age are not obvious. It seems too late to relate to puberty. However, in later teenage years, parental influence is waning, and use of health-care services might fall. SEARCH for Diabetes in Youth only captures clinically diagnosed cases, and a reduced incidence of type 2 diabetes after the age of 16 years might simply reflect a failure to diagnose. If the peak at the age of 16 years is real, there must be an upturn in incidence within the next decade, given the recently published evidence of a progressive rise in incidence throughout the early adult years.[6] This upturn would also need to be explained. The authors suggest that the observed peak might offer opportunities for intervention. In fact, the real message of this peak might be that interventions are needed to improve screening and diagnosis in this late-teenage group, in order to avoid delayed diagnosis and its long-term consequences. Similar concerns relate to the incidence peak in August, which might relate to school holidays, as the authors note, or to the impending start of the new school year.

Youth and young-adult-onset type 2 diabetes are growing problems leading to poor outcomes and to widening social inequality, adversely affecting a population that might already be disadvantaged. Better information about its natural history, prevention, and management is urgently needed.

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Biodiversity and its double-edged role in the pathogenesis of type 1 diabetes

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Over the past decade, research into the mechanistic pathways and causal factors of type 1 diabetes has revealed increasing complexity in its pathogenesis. The immune system is a key mediator between the genomics of an individual who is susceptible to type 1 diabetes and the immediate environment.[1] At present,

contrasting postulations exist regarding the basis of islet cell autoimmunity, and the nature of the environmental trigger has yet to be elucidated. There are considerations for the viral hypothesis, whereby an inciting viral infection, such as the human enterovirus, sets off a cascade of immunological and proinflammatory processes, culminating in β cell destruction.[2] Conversely, the biodiversity hypothesis has also gained traction, proposing that microbiota diversity and stability maintains immune balance, and its disruption causes disarray resulting in the development of autoimmune diseases, including type 1 diabetes.[3]

In this issue of *The Lancet Diabetes & Endocrinology*, Mikael Knip and colleagues[4] showed an increase in the incidence of type 1 diabetes among children during a period of COVID-19 lockdown in Finland. Further analysis into their cohort, assembled from the Finnish Pediatric Diabetes Register (FPDR), revealed a low prevalence of documented SARS-CoV-2 infection (established through antibody analysis). The authors propose that the observed increase in paediatric type 1 diabetes incidence is related to reduced microbial exposure during the period of physical distancing, with further preliminary data suggesting reversibility when the easing of those measures corresponded with a reduction in the number of people with newly diagnosed type 1 diabetes in a similar time interval. This observation is consistent with the biodiversity hypothesis, underscoring the importance of the human microbiome in safeguarding against inflammation and autoimmunity.[3] However, it should be taken into account that up to 25% of the study's cohort did not undergo SARS-CoV-2 antibody testing when interpreting the findings of this study. In addition, the association observed in the study should not be equated to being causative, especially without biomarkers or comparisons of microbiota that could potentially substantiate the biological plausibility of this observation. The exact mechanisms to explain how social isolation measures affect biodiversity have yet to be examined. Most published evidence has linked type 1 diabetes with gut microbiota, with alterations in gut flora compositions modulating risks of developing type 1 diabetes through intestinal permeability, molecular mimicry, and regulation of both innate and adaptive immunity.[5] Social interaction seems to be a major determinant of the gut microbiome, with distinct alterations and a reduced gut microbiome diversity detected post-pandemic, attributed to the reduced person-to-person and environment-to-person transmissibility of microorganisms.[6]


Iryna Tolmachova/EyeEm

However, it could be argued that the increase in type 1 diabetes incidence described in the study by Knip and colleagues[4] is consistent with the viral hypothesis as a pathogenesis trigger. Apart from the commonly implicated coxsackieviruses, SARS-CoV-2 infections have also been linked to the development of type 1 diabetes. In addition to an immunological pathophysiology, the SARS-CoV-2 virus has been shown to exert direct cytopathic effects leading to pancreatitis and increased pancreatic endocrine cell apoptosis, triggering chemokine and cytokine responses leading to β-cell loss and the induction of new-onset diabetes.[7] The β cell is also susceptible to collateral damage from multisystem inflammatory syndrome in children, causing pancreatitis.[8] The argument for the viral hypothesis did not come across strongly in the current study, given the low rates and method of documentation of SARS-CoV-2 infection status via serology testing. Previous studies have shown that children might not necessarily have 100% seropositivity because of T-cell response heterogeneity.[9] The addition of nasopharyngeal aspirate PCR or antigen rapid tests would add strength to the findings of the current study. Furthermore, it would be interesting to consider the differences in immunogenicity of the various SARS-CoV-2 variants.

The current population-based study offers lessons for future pandemic preparedness. Even though first principles in the management of an outbreak are containment and lockdown, the latter brings about downstream metabolic effects with increases in type 1 diabetes, childhood obesity, metabolic syndrome, and type 2 diabetes, which need to be considered. At a policy making level, this should prompt the strengthening of supply chains for the care of people with diabetes. Novel interventions might also include microbiome restorative approaches such as nutritional strategies[6] at a population level to avert the microbial perturbations caused by social lockdowns. With these considerations, we can better prepare for the potential collateral damage of future pandemic threats.

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New clinical practice guideline for evaluation and treatment of children and adolescents with obesity: paradigm shifts


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Paediatric obesity has become a pandemic affecting nearly all regions in the world.[1,2] Obesity in childhood and adolescence has major implications because it usually persists into adulthood and is associated with many somatic and psychological comorbidities, which can result in premature death.[3] Furthermore, children and adolescents with obesity and their parents face stigmatisation, which leads to many social problems. Based on a review of US-based studies from which lifetime medical cost estimates can be extracted, the medical costs of the cohort of children aged 10 years with lifelong obesity were estimated to be between US$9·4 billion and $14·0 billion.[4] From a socioeconomic perspective, the expenses for adolescents with obesity who remain in the same BMI category during their adult life are assumed to be €4200 for men and €2440 for women per person per year, due to productivity losses including sick-leave days, long-term incapacity, and early retirement.[5] For all these reasons, effective treatment strategies for paediatric obesity are urgently needed. However, most children and adolescents with overweight or obesity do not seek treatment.[6] In addition, lifestyle interventions frequently fail in clinical practice, and are likely to lead to disappointment and frustration among therapists.[3,7]

The American Academy of Pediatrics (AAP) has developed a new clinical practice guideline for the evaluation and treatment of children and adolescents with obesity.[8] A large multidisciplinary team, consisting of several professions from the tertiary as well as primary care sectors, analysed the existing practical and research knowledge concerning two main questions: "What are effective clinically based treatments for pediatric obesity?" and "What is the risk of comorbidities among children with obesity?". This AAP guideline resulted in an up to date educational book of childhood obesity, citing more than 800 references summarising current knowledge of causes, diagnosis, and treatment of pediatric obesity, as well as research gaps (which were perceived predominantly in the barriers and outcomes of different treatment approaches).

The recommendations in this AAP guideline will hopefully improve outcomes in paediatric obesity, due to shifts in several paradigms. First, this guideline not only describes the (unconscious and conscious) stigmatisation and bullying of children and adolescents with obesity and their parents by health-care professionals (which is likely to lead to reduced treatment adherence), but also advises how to improve communication to create a more accepting and supportive treatment approach. Second, the simple explanatory model of obesity (too high calorie intake in combination with too little physical activity) has been replaced by a complex multicomponent model, including life circumstances in a so-called obesogenic environment, genetics, social and